

FORECASTING ANTHRACNOSE DEVELOPMENT ON ANNUAL BLUEGRASS FROM WEATHER DATA

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Anthracnose, incited by Colletotrichum graminicola is a serious disease of annual bluegrass in Michigan. Field symptoms first appear as irregular shaped patches of yellow-bronze turf that range in size from a few inches to several feet. As the disease progresses the color fades and turns to a light tan. Leaf lesions initially appear as elongated reddish brown spots. The diagnostic key for this disease is the development of black spiny fruit in bodies called acervuli on the leaf blade.

The disease usually occurs during warm weather. In the past, anthracnose has been devastating to golf course turf in some years, but not all. The purpose of this research was to develop a means of forecasting when anthracnose would occur and the severity of the infection.

The Model

The Anthracnose Severity Index (ASI) model was developed to predict the occurrence of anthracnose on annual bluegrass. The model is able to forecast the disease severity of anthracnose ten days preceding maximum symptom development. The model is:

$$\text{ASI} = 4.023 - (0.228 \times \text{LW}) - (0.531 \times \text{T}) - (0.001 \times \text{LW}^2) + (0.020 \times \text{T}^2) + (0.015 \times \text{T} \times \text{LW})$$

in which,

ASI = anthracnose severity index

LW = hours of leaf wetness (the time free moisture is present on the leaf blade)

T = average daily temperature (celsius)

The only equipment needed to use the ASI model is a calculator and leaf wetness recorder (Belfort Instrument Co., 1600 South Clinton Street, Baltimore, Maryland 21224). To use the model, calculate the average daily temperature in celsius and determine the hours of leaf wetness, then substitute the average daily temperature where all the T's appear and the hours of leaf wetness where the LW's are. Spray recommendations are made on an average of three consecutive daily ASI values. The ASI values mean:

< 2 = no disease

2 - 2.5 = good chance of disease development

> 2.5 = conditions excellent for anthracnose. Consider spraying.

The ASI model should be used after maximum seedhead production of annual bluegrass has occurred and temperatures are between 16° and 28° celsius.

Anthracnose management strategies based on the model

The model may allow for the development of new disease management strategies for the anthracnose disease. Turf managers could reduce the severity of disease by reducing periods of leaf wetness at critical times. This could be accomplished through mechanical removal of dew or changing from early-evening to late-morning irrigation practices. It may also be possible to time fungicides with this model. However, before fungicides

can be combined with these predictions, it must be established whether fungicides with curative activity are available. This is because spray treatments used on the model will be delayed until infection has occurred. Work is currently being done to combine these predictions and the use of fungicides.